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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,950	10/01/2003	Eric Cheng	38699-8036US	7855
25096	7590	07/12/2004	EXAMINER	
PERKINS COIE LLP				NGUYEN, JOHN B
PATENT-SEA				ART UNIT
P.O. BOX 1247				PAPER NUMBER
SEATTLE, WA 98111-1247				2819

DATE MAILED: 07/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)
	10/676,950	CHENG ET AL. <i>OK</i>
	Examiner	Art Unit
	John B Nguyen	2819

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on _____.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-31 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) ____ is/are allowed.
 6) Claim(s) 1-31 is/are rejected.
 7) Claim(s) ____ is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 01 October 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 6 recites the limitation "said plurality of low-order low-pass filters are plurality of first order RC filters" in lines 3 and 4. There is insufficient antecedent basis for this limitation in the claim. Because claim 5, lines 9 recites "a plurality of high-order low-pass filter...".

3. Claim 21 recites the limitation "said plurality of filters are plurality of first order RC filters" in line 4. There is insufficient antecedent basis for this limitation in the claim. Because claim 20, does not recites "a plurality of filter"

4. Claim 29 recites the limitation "wherein said interpolator is a time-sharing interpolator" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim. Because claim 28 does not recites "an interpolator".

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-4, 8,12,19,23,27 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon (US Patent No. 6,433,719 B2) and in view of Lim (US Patent No. 6,583,662 B1) and further in view of Walden et al. (US Patent No. 5,841,382).

Regarding to claims 1-4, 8,12,19,23,27 and 31, Fig. 4 and Fig. 8 Yoon discloses a system of multi-channel shared resistor-string digital-to-analog converters comprising: a multi-channel shared resistor-string digital-to-analog converters (fig. 8) (Claim 1); a shared resistor string (fig. 4, 404); a plurality of decoders (fig. 4, 420) for receiving a M bits (D[0:9], D[10:19]) modulated digital input signal; a plurality of switches (fig. 4, 410) connected to the shared resistor string and the plurality of decoders (fig. 4); and a plurality of buffers (fig.4, 424, column 6, line 23-24) (Claim 3).

Yoon fails to disclose a high-order low-pass filters for attenuating the residue images of out-of-band noise (claim 1); a multi-channel analog staircase waveform outputs (Claim 2); the high-order low-pass filters is the high-order RC filters (claim 2); and the switch includes MOS or CMOS (claims 4,8,12,19,23,27 and 31).

However, Lim discloses a high-order low-pass filters for attenuating the residue images of out-of-band noise (fig. 7B, column 15, line 60-65); a multi-channel analog staircase waveform outputs (fig.5, column 14, line 30-47); and the high-order low-pass filters is the high-order RC filters (fig.8B); and Walden et al. discloses the switch includes MOS or CMOS (column 1, line 14-16).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the system of Yoon to the system of Lim and Walden et al. to allow frequencies below a corner frequency to pass without attenuation. Thereafter, frequencies greater than the corner frequency may be attenuated or filtered.

7. Claims 5-7, 9-11, 13-18, 20-22, 24-26 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon (US Patent No. 6,433,719 B2) and in view of Lim (US Patent No. 6,583,662 B1) and further in view of Rhode et al. (US Patent No. 6,281,821 B1).

Regarding to claims 5-7, 9-11, 13-18, 20-22, 24-26 and 28-30, Fig. 4 and Fig. 8 Yoon discloses a system of multi-channel shared resistor-string digital-to-analog converters, comprising: a multi-channel shared resistor-string digital-to-analog converters (fig. 8) (Claims 5,9,13,16,20,24,28); a shared resistor string (fig. 4, 404); a plurality of decoders (fig. 4, 420) for receiving a M bits (D[0:9], D[10:19]) modulated digital input signal; a plurality of switches (fig. 4, 410) connected to the shared resistor string and the plurality of decoders (fig. 4); and a plurality of buffers (fig.4, 424, column 6, line 23-24) (Claims 7,11,15,18,22,26,30).

Yoon fails to disclose an interpolator (claims 5, 6, 9,13,14,16,20,21,24,25,28,29); a sigma-delta modulator (claims 13,14,16,20,21); and a low-order low-pass filters for attenuating the residue images of out-of-band noise (claims 9,13,16,20,24); a high-order low-pass filters for attenuating the residue images of out-of-band noise (claims 5, 28); a

high order low-pass filter is the high order RC filter (claims 6,29); and low-order low-pass filter is the first order RC filter (claims 10,14,21,25).

However, Lim discloses a low-order low-pass filters for attenuating the residue images of out-of-band noise (fig. 7A, column 15, line 32-40); a high-order low-pass filters for attenuating the residue images of out-of-band noise (fig. 7B, column 15, lines 60-65); a high order RC filter (fig.8B); a multi-channel analog staircase waveform outputs (fig.5, column 14, line 30-47); and Rhode et al. discloses an interpolator (fig.7, 710L, 710R); a sigma-delta modulator (fig. 7, 720L, 720R); and a first order RC filter (fig. 10),

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the system of Yoon to the system of Lim and Rhode et al. for the purpose of the interpolator to provides a plurality of calculated intermediate samples and passed the interpolated values to the delta-sigma modulator and the high-order low-pass filter/low-order low-pass filters to allow the frequencies below a corner frequency to pass without attenuation. Thereafter, frequencies greater than the corner frequency may be attenuated or filtered.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. (See enclosed Form PTO-892).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Nguyen whose telephone number (571) 272-

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1808. The examiner can normally be reached on 8AM-4: 30 PM M-F.


John B. Nguyen
June 28, 2004